PAYLOAD HAZARD REPORT

NO: SWAB-2

PAYLOAD: **HRF SWAB Air Sampling Device**

PHASE: II

SUBSYSTEM: Electrical

HAZARD GROUP: INJURY/ILLNESS

DATE: November 2003

HAZARD TITLE: Battery Leakage or Rupture

APPLICABLE SAFETY REQUIREMENTS:
NSTS 1700.7B 201.3, 209.1, 213.2
ISS Addendum 201.3, 209.1, 213.2

X **CATASTROPHIC**
☐ **CRITICAL**

DESCRIPTION OF HAZARD:
The rupture of a Li-BCX cell within the battery pack and escape of electrolytes can lead to fire, explosion, corrosion, contamination and potential injury to the crew. The battery pack is made up of five series-connected 3.4V, 7Ah Lithium Bromine Chloride Complex C-size cells (WGL p/n 3B4250-ST).

HAZARD CAUSES:
1. Short circuit (internal/external)
2. Charging of primary cells
3. Over-discharging of cells

See continuation sheet

HAZARD CONTROLS:
1.1 The cell packaging design prevents internal movement thereby preventing internal shorts. Lot testing is performed to verify tolerance to internal shorts.
1.2 External short circuit controls include keyed battery connector, cell 4A pico fuse, pack thermal fuses (2), board-mounted 3A fuse and shrink tubing around cells and pack covering any exposed surfaces. Pack-level acceptance testing will be performed.
1.3 Wire sizing will be per TA-92-038.
2.1 No other power source is present. Charging of the battery pack is prevented by removal of the external power input connector of the charging circuit.
3.1 Over-discharge will be prevented via the 2 parallel shunt diodes per cell, 2 battery pack thermal fuses and the board mounted 3A fuse.
3.2 Battery pack will be built using voltage-matched cells.

See continuation sheet

SAFETY VERIFICATION METHODS:
1.1.1 Verification of cell level acceptance and lot verification testing performed per USA FEPC document # P528/ATP-08001/M.
1.2.1 Review of design, see attached schematic.
1.2.2 Verification of pack level acceptance testing including OCV, CCV, vibration and vacuum.
1.3.1 Review of design for proper wire sizing, see attached schematic.
2.1.1 Review of design to show no other power source is present and power input connector is removed.
3.1.1 Review of design, see attached schematic.
3.2.1 Verification of battery cell matching conducted by USA FEPC.

See continuation sheet

STATUS OF VERIFICATION:
1.1.1 Open
1.2.1 Open
1.2.2 Open
1.3.1 Open
2.1.1 Open
3.1.1 Open
3.2.1 Open

See continuation sheet

APPROVAL	PAYLOAD ORGANIZATION	STS
PHASE I		
PHASE II		

PHASE III		

PAYLOAD HAZARD REPORT CONTINUATION SHEET	NO: SWAB-2
PAYLOAD: HRF – SWAB ASD	PHASE: II

HAZARD CAUSES (continued):
4. Build up of internal cell pressure.
5. Over-temperature (Discharge Only)
6. Inadequate containment of electrolyte

HAZARD CONTROLS (continued):
4.1 Cells are tolerant to internal and external short circuit. The cells are hermetically sealed with a maximum case design pressure of 800-2000 psi.

5.1 Worst case temperatures are within tolerance limits of the cell manufacturer's specifications.

6.1 Cells are tolerant to internal and external shorts and hermetically sealed.

SAFETY VERIFICATION METHODS (continued):
4.1.1 Verification of lot testing to confirm cell short circuit tolerance.
4.1.2 Cell product sheet noting case pressure.
5.1.1 Cell product sheet noting temperature tolerance.
6.1.1 Cell product sheet noting hermetic seal.
6.1.2 Verification of lot testing to confirm cell short circuit tolerance.

STATUS OF VERIFICATION:
4.1.1 Open
4.1.2 Open
5.1.1 Open
6.1.1 Open
6.1.2 Open